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## CLINICAL NOTES

# Role of Conventional and Diffusion-Weighted Magnetic Resonance Imaging of Spinal Treatment Protocol for Hydatid Disease

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**Abstract**

**Objective:** To demonstrate the role of magnetic resonance imaging (MRI) in determining the treatment protocol for hydatid disease of the spine.

**Design:** Case report; literature review.

**Findings:** Diffusion-weighted MRI can help differentiate complicated infected hydatidosis from abscesses, epidermoid cysts from arachnoid cysts, and benign from malignant vertebral compression fractures. It is also helpful in differentiating between abscesses and necrotic tumors.

**Conclusion:** Diffusion-weighted MRI can help differentiate between infections requiring immediate surgery and those that can be treated medically with antihelmintic treatment.

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**Key Words:** Hydatidosis; Spine; Imaging studies; Diffusion-weighted MRI; Abscess, spinal; Albendazole; *Echinococcosis granulosus*; Paraplegia; Spinal cysts, epidermoid, arachnoid, hydatid; Vertebral compression fractures

## INTRODUCTION

Hydatid disease is caused by a parasitic tapeworm, *Echinococcosis granulosus*. Humans are infected by ingesting the eggs excreted by dogs, which are the definitive hosts. The liver and lungs are involved in approximately 90% of cases, whereas bone involvement has been reported in only 0.5% to 4% (1–4). Approximately 50% of the cases of hydatidosis of bone cases have spinal involvement (5). The disease occurs by direct extension from a pulmonary infestation (6) or, less often, begins primarily in the vertebral body (7). We report a patient with lumbar intradural hydatid disease who was diagnosed by conventional scanning and diffusion-weighted magnetic resonance imaging (MRI). In addition, the MRI and diffusion-weighted imaging characteristics of this unusual disease play an important role in determining the treatment protocol.

## CASE REPORT

A 14-year-old boy presented with lumbar pain and difficulty in walking for the last 3 months. Physical examination showed bilateral lower extremity weakness. Laboratory results showed an erythrocyte sedimentation rate of 50 mm/h. In addition, Casoni test and cyst hydatid indirect hemagglutination test were positive. Past history revealed an operation for lung hydatidosis 3 years previously. Magnetic resonance imaging showed cystic multiloculated lesions in the spinal canal at L4–L5 and S1–S2 disk levels. The cystic lesions that were filling the spinal canal without bone involvement were hypointense on T1 (Figure 1a) and hyperintense on T2-weighted images (Figure 1b). Diffusion-weighted (b = 1,000) MRI showed hypointensity in the cystic lesions (Figure 2a). Apparent diffusion-coefficient map images showed hyperintensity at the same level (Figure 2b). Accordingly, there was no restricted diffusion in the spinal canal.

## DISCUSSION

Spinal involvement in hydatid disease is the result of protovertebral shunts (8). The thoracic and lumbar spines are involved in 75% of cases, with neurologic deficit in 25% to 84% of cases (9–12). With regard to prognosis, the condition has a reported mortality rate of

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**Figure 1a, b.** *Sagittal T1- and T2-weighted magnetic resonance image of the lumbosacral spine showing multiple cysts of various sizes in the intradural position.*

50% (13). Frequently observed clinical manifestations of this disorder include sphincter disturbances, paresthesia, paraparesis, and, ultimately, paraplegia (14–16). In 1981, Braithwaite and Lees (17) classified 5 major groups of spinal hydatid lesions causing paraplegia: (a) primary intramedullary cyst, (b) intradural extramedullary cyst, (c) extradural intraspinal cyst, (d) hydatid disease of the vertebra, and (e) paravertebral hydatid disease. This patient had intradural extramedullary hydatid cysts without vertebral or paravertebral involvement.

Magnetic resonance imaging is the most helpful tool in diagnosing spinal hydatidosis (18,19). The multilocular imaging appearance is one characteristic of hydatid cyst disease, as was the appearance in this patient. In addition, MRI is more reliable than computed tomography because it shows the typical signs of a pericystic wall and its multilocular character and has a special value in showing the relationship of the lesion to the surrounding organs (20).

In the last decade, diffusion-weighted imaging has become more widely used. It is used in differentiating epidermoid cysts and arachnoid cysts, as well as benign and malignant vertebral compression fractures. It is also helpful in differentiating abscesses and necrotic tumors. Purulent content of an abscess restricts the diffusion of water molecules, resulting in a hyperintense appearance. Nevertheless, in cystic or necrotic parts of tumors, inflammatory cells and debris are relatively less intense. The cavity is serous and has low viscosity; thus, restriction in diffusion movement is not marked (21).

The most important disadvantage of diffusion-weighted imaging is limited reflection of anatomic details compared with that offered by conventional MRI. Other limitations in cysts with spinal involvement are inhomogeneous magnetic environment, the small size of the spinal cord, and increased motion in and around the spine. Diffusion-weighted imaging has the potential to differentiate between spinal hydatidosis and abscesses or infected cystic lesions. The differentiation is important for treatment planning. Presence of restricted diffusion shows us that the cystic lesions are complicated infected cystic lesions or abscesses. Ab-

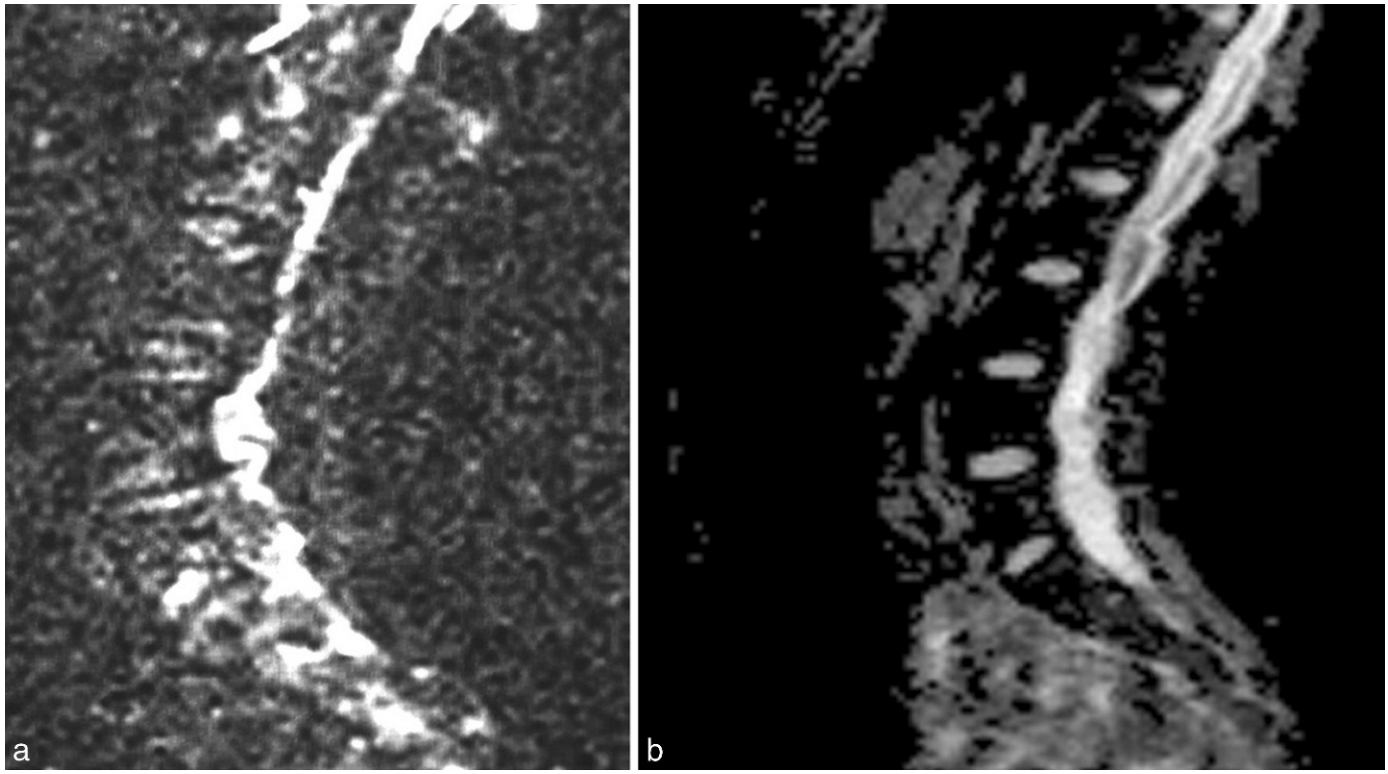


**Figure 2a, b.** *Sagittal diffusion-weighted (b = 1,000) and apparent diffusion-coefficient map magnetic resonance images show no restricted diffusion in the cystic lesions.*

scesses and infected cystic lesions require urgent surgery. On the other hand, medical antihelmintic treatment could be an alternative to surgery for uncomplicated uninfected hydatidosis. Golematis et al (22) reported that albendazole decreased the size of the large cysts and cured the smaller ones. The effectiveness of medical therapy may be evaluated with follow-up computed tomography and MRI showing the disappearance or gradual shrinkage of the cysts, calcification of the cyst wall, or maintenance of the cyst size for 1 year (23).

## CONCLUSION

Conventional scanning and diffusion-weighted MRI are useful not only in the diagnosis of intradural extramedullary hydatid disease of the spine but also in determining a treatment protocol.

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